FOREST PEST MANAGEMENT
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A BIOLOGICAL EVALUATION OF LODGEPOLE PINE MORTALITY IN PARKS CREEK DRAINAGE, MT. SHASTA RANGER DISTRICT, SHASTA-TRINITY NATIONAL FORESTS

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ABSTRACT

Mountain pine beetle caused extensive mortality of lodgepole and western white pines in the upper Parks Creek drainage during 1983. Factors which contributed to the outbreak include a high proportion of the stand consisting of overmature hosts of the mountain pine beetle, dense stocking, dwarf mistletoe and below normal snow packs in recent years. Mortality should be low at Parks Creek for the near future because most of the susceptible trees have already been killed. Other nearby drainages probably have stand conditions similar to those existing at Park Creek a few years ago. Stand treatments that increase vigor could probably prevent future mortality at Parks Creek and other similar drainages.

INTRODUCTION

Paul Finke from the Mt. Shasta Ranger District requested an evaluation of a recent high level of tree mortality in the Parks Creek Drainage. On June 14, 1984, Dave Schultz and Bruce Roettgering from the FPM Staff, Dave Trevisan and Paul Finke from the District and Lans Thornton from the S.O. examined the area.

OBSERVATIONS

The Upper Parks Creek drainage (T41N, R6W, S28) is at an elevation of about 6,000 to 6,400 ft. The soil is relatively shallow and rocky. The predominant tree species present is lodgepole pine. Other tree species present include red fir, white fir, Douglas-fir, ponderosa pine, western white pine, incense-cedar and mountain hemlock. The dominant lodgepole

pine near the creek are 180-190 years old and about 80 feet tall. Lodgepole pine dwarf mistletoe, Arceuthobium americanum, is extremely common in the area. Snags and down material indicate that the mountain pine beetle, Dendroctonus ponderosae, had been causing chronic low level lodgepole pine mortality in the area for many years. Mountain pine beetle probably built up in the larger diameter lodgepole pine near the creek during 1982, although the infestation may have begun to increase a year or two earlier. In 1983 the beetles moved up the sides of the drainage and killed a high proportion of the mature lodgepole pine as well as a few western white pine over an area of about one-half of a section. There was very little beetle brood produced from the 1983 attacks in the trees on the drainage slopes. These trees were generally less suitable for the beetles than those near the creek because of smaller diameters and thinner bark and phloem. The recent episode of mortality is probably the result of increased susceptibility to bark beetles caused by an interaction of stand conditions and precipitation patterns. Increment cores and stump surfaces from some of the larger lodgepole pines near the creek indicate that growth has been slow for decades. Fairly heavy stocking for the site, competition from the understory and brush, and infection by dwarf mistletoe have probably contributed to the slow growth rate. A long term pattern of below normal snow pack in the spring has probably influenced tree growth and susceptibility to the mountain pine beetle. The maximum snow pack normally occurs on April 1. Early April snow surveys at 6,700 ft. elevation at Parks Creek have shown below normal water content in two-thirds of the recent surveys.

Year	1975	1976	1977	1978	1979	1980	1981	1982	1983
% Ave. 4/1 Water content	161%	62%	33%	137%	68%	86%	68%	87%	208%

The current mountain pine beetle population is relatively small and is confined to a few trees scattered throughout the drainage. Many of these trees still have green foliage because successful beetle attacks killed cambium on only one side of the tree. There will be some additional mortality as green trees which have already been attacked begin to fade. Future mortality should be lower than that experienced in recent years because the average stand age and basal area have been lowered and also, most of the susceptible trees have already been killed.

MANAGEMENT ALTERNATIVES FOR PARKS CREEK

1. Do Nothing. Widespread tree mortality should be over by 1984. A few green trees will fade this year because they are already infested. Mortality should be low until the seedlings and saplings which now comprise the majority of the lodgepole pine reach 6 to 8" dbh and intertree or brush competition begins to cause stress. Mortality has shifted stand composition toward more shade tolerant species, but lodgepole pine should still comprise a significant portion of the stand. Lodgepole pine dwarf mistletoe is present in the stand and will increase

with time. If no action is taken to control stocking density, species composition or dwarf mistletoe infection, similar episodes of mortality should be expected in the future. Visual quality will probably be low and fuel loading will be high in the area for the next 5 to 10 years.

2. Salvage dead and obviously infested trees. Some mountain pine beetle would be removed during salvage, but others would remain in trees which are inaccessible or non-commercial, and green trees attacked on only one side. Mortality should be low in the immediate future whether salvage occurs or not. Salvage would probably improve visual quality, lower fuel loading and might make a small return to the Treasury.

3. Sanitize accessible areas. The future health of the stands could be improved by removing some of the remaining green trees. It would be advantageous to remove overstory lodgepole pine which are infected with dwarf mistletoe to stop the continual reinfection of the understory. Because future mountain pine beetle outbreaks are likely to originate in large diameter lodgepole pine with thick phloem, some protection could be obtained by improving the vigor of trees along the creek. Reducing the basal area should improve the growth and vigor of the leave trees and would offer the opportunity to remove some of the trees most likely to become the centers of mountain pine beetle group kills. Lodgepole and western white pines which have flat-topped crowns, thin crowns, dead branches in the crown or low needle retention are often quite susceptible to beetle attack. Discriminating against lodgepole pine when selecting leave trees would result in more mixed stands in parts of the drainage. Mixed stands are generally more resistant to pest damage than stands dominated by a single species.

DISCUSSION

The condition of the upper drainages of some nearby creeks is probably similar to that at Parks Creek several years ago. Mountain pine beetle is undoubtedly present in these stands, maintaining its population by breeding in suppressed or lightning damaged trees and killing strips of cambium on living trees. If environmental conditions stress enough trees, mountain pine beetle may build up in larger diameter lodgepole pine with thick phloem growing near creeks or lakes. The beetles that emerge from these trees may kill a considerable number of smaller diameter trees on the slopes, although breeding success will be low and the infestation will die out.

Depending upon access and the value of resources at risk, it may be warranted to take action to prevent future tree mortality in these drainages. If the timber has low value and there are no permanent recreation facilities, pre-salvage of decadent green timber and sanitation of severely diseased or overstocked aggregations may be the maximum effort that could be justified. Regardless of the intensity of treatment, initial efforts should be directed toward larger diameter trees with thick phloem which usually grow near streams or lakes because they have the greatest influence on beetle population buildups.